Mini-Test 1 - MTH 1420

Dr. Graham-Squire, Spring 2012

Name: _____

ID Number: _____

I pledge that I have neither given nor received any unauthorized assistance on this exam.

_____

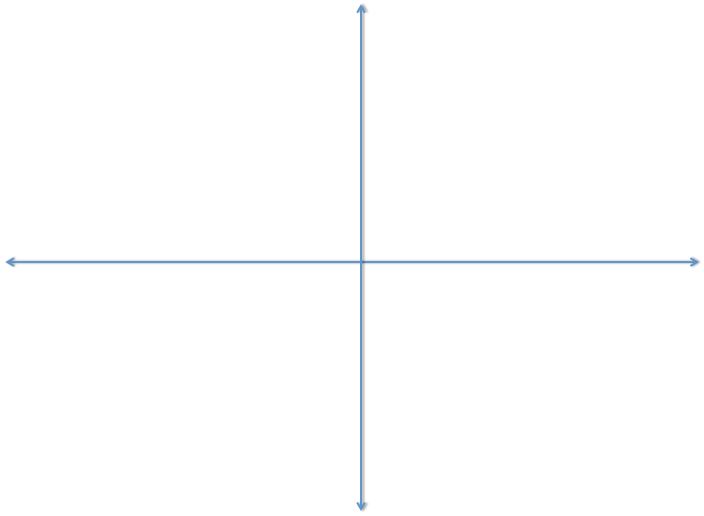
(*signature*)

DIRECTIONS

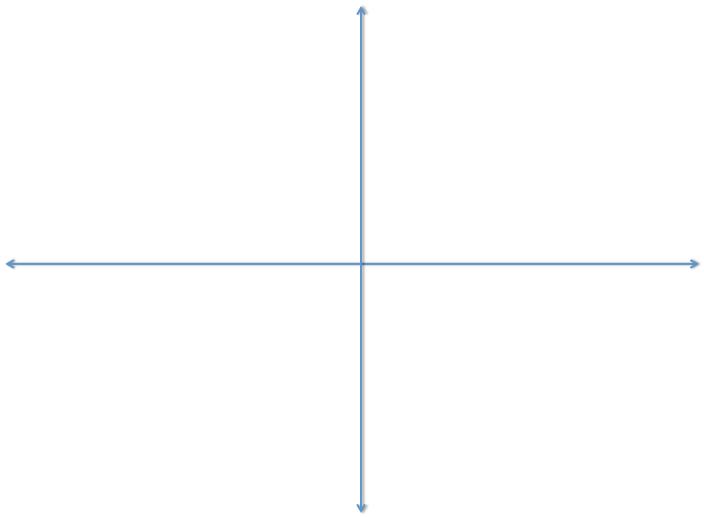
1. Show all of your work and use correct notation. A correct answer with insufficient work or incorrect notation will lose points.
2. Clearly indicate your answer by putting a box around it.
3. Cell phones and computers are <u>not</u> allowed on this test. Calculators <u>are</u> allowed on the first part of the test. For the last two questions you CANNOT use a calculator.
4. Give all answers in exact form, not decimal form (that is, put π instead of 3.1415, $\sqrt{2}$ instead of 1.414, etc) unless otherwise stated.
5. Make sure you sign the pledge and write your ID on both pages.
6. Number of questions = 5. Total Points = 50.

ID Number: _____

1. (10 points) Approximate the value of $\int_0^6 (x^2 - 5)\,dx$ using three subintervals and evaluating at the *right* endpoint (that is, calculate R_3). Sketch a picture of the rectangles and the graph.



2. (10 points) Let $f(x) = x^3 - 4x^2 + 4x$. Use definite integrals to find the *actual area* between the curve $f(x)$ and the x-axis, between the x values $x = -1$ and $x = 2$. (Note: "actual area" means that all area is counted positively.) You can use a calculator to help, but make sure to show and explain all of your work.



3. (10 points) Find $\int_0^2 3x\,dx$ by calculating the limit for R_n as n goes to infinity. In other words, find

$$\lim_{n\to\infty} \sum_{i=1}^{n} \Delta x f(x_i)$$

for $f(x) = 3x$ on the interval $[0, 2]$.

You will need to use the magic formula that $\sum_{i=1}^{n} i = 1+2+3+\cdots+n = \frac{n(n+1)}{2}$. To get started, write out the value of Δx for a general value of n, then use that to find a general expression for $f(x_i)$. Now substitute those into the limit above and solve.

4. (10 points) NO CALCULATORS. Let $g(x) = \int_{\pi/4}^{x} (3t^2 + \sec^2 t)\, dt$.

(a) Evaluate the integral to find an expression for $g(x)$.

(b) Take the derivative of your result from part (a) to find $g'(x)$. Then explain how/why you could use the Fundamental Theorem of Calculus to find $g'(x)$ without doing part (a).

5. (10 points) NO CALCULATORS. Use the method of substitution to find $\int \frac{x^2}{x^3+7}\,dx$.

Extra Credit(1 point) If $\int_1^6 f(x)dx = 10$ and $\int_4^6 f(x)dx = -3$, what is $\int_1^4 f(x)dx$? Explain why.